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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

November 13, 2000

Ms. Magalie Roman Salas
Secretary, Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: *Deployment of Wireline Services Offering Advanced Telecommunications Capability* and *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 98-147 and CC Docket No. 96-98

Ex parte presentation pursuant to C.F.R. §1.1206

Dear Ms. Salas:

Catena Networks, Inc. ("Catena") met last Thursday with staff of the Policy & Program Planning Division and the Network Services Division of the Common Carrier Bureau. Gary Bolton, Jonathan Boocock and the undersigned counsel for Catena attended the meeting on behalf of Catena. During the meeting, Catena discussed its positions in this proceeding as summarized in the attached charts, which were distributed at the meeting.

Respectfully submitted,

Stephen L. Goodman
Counsel for Catena

cc: Johanna Mikes
Staci L. Pies

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Ex parte presentation

Further NPRM Comments

CC Docket No. 98-147, 96-98

Gary Bolton

VP Product Marketing

November 9, 2000

Catena Comment Summary

Basic Premise

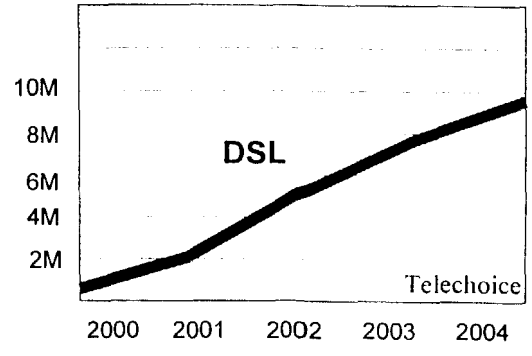
- Catena's focus is to drive technology innovation and integration to enable advanced services, specifically DSL, to be as ubiquitous, affordable and available as POTS is today
- Regulatory policy should encourage, not impede, technology innovation and silicon integration that will significantly benefit all Americans

Catena's Comments:

- Adopt a regulatory collocation model for remote terminals that is consistent with the virtual unbundling model applied in the *Pronto Waiver*
  - RT collocation model must allow the integration of POTS and DSL on a single subscriber loop interface
- CO collocation regulatory model is not generally extendable to remote terminals
  - Economic barrier to competition
  - Proliferates digital divide and slows deployment
  - POTS Splitter complications
  - Prevents deployment of important advances in technology and services

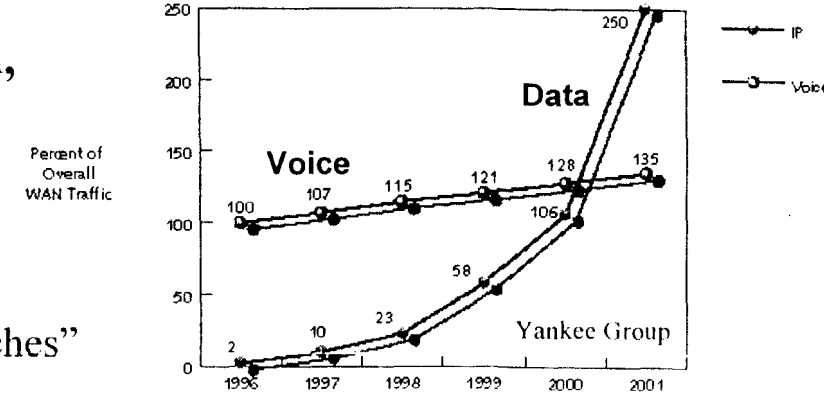
Industry Trends

- **Significant demand for DSL service**
  - DSL market expected to grow 128% per year through 2003
  - Over 40% of subscribers still unable to get DSL

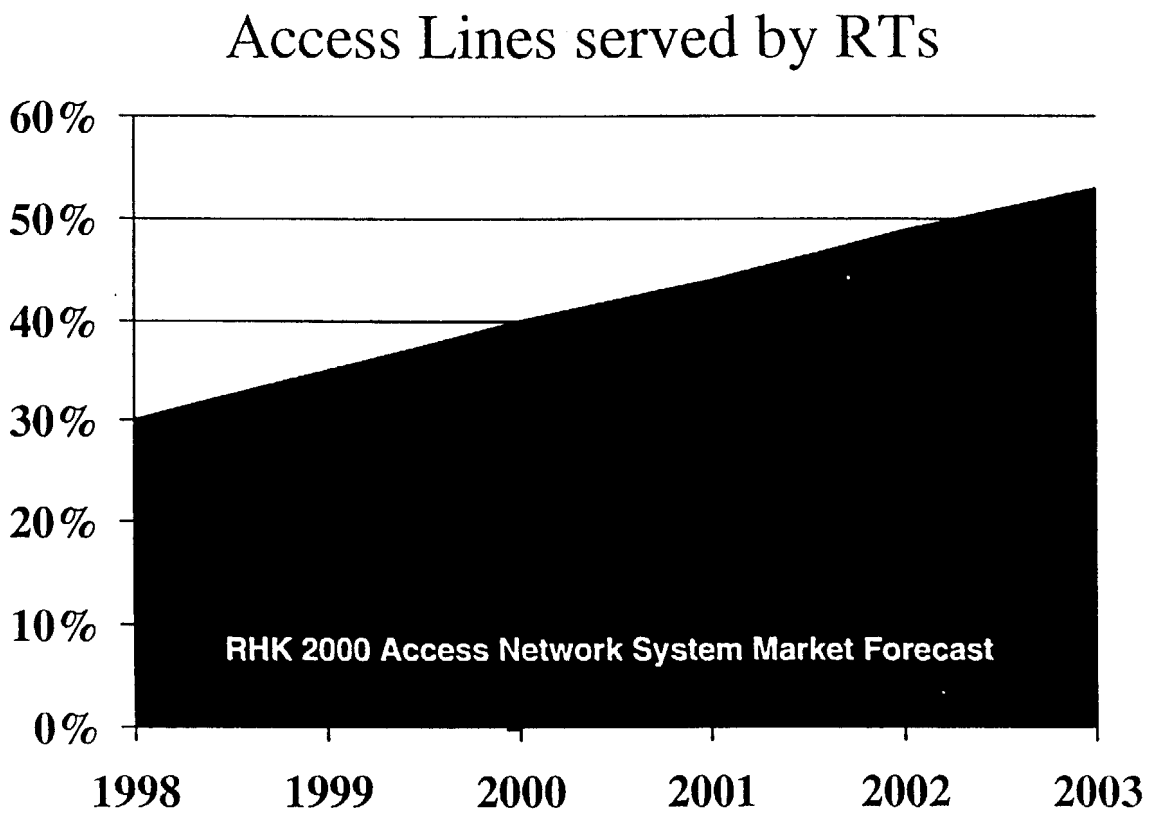


- **The majority of subscribers will be served from Remote Terminals (RTs).**
  - 60%+ of new lines are deployed from RTs
  - In 2 years, half of subscribers will be served from RTs

- **Voice and Data are migrating to a converged, packet-based network**
  - The volume of Data traffic has over taken Voice on today's TDM-based network
  - In 3 years, TDM voice switches will start being displaced by converged packet-based "soft switches"

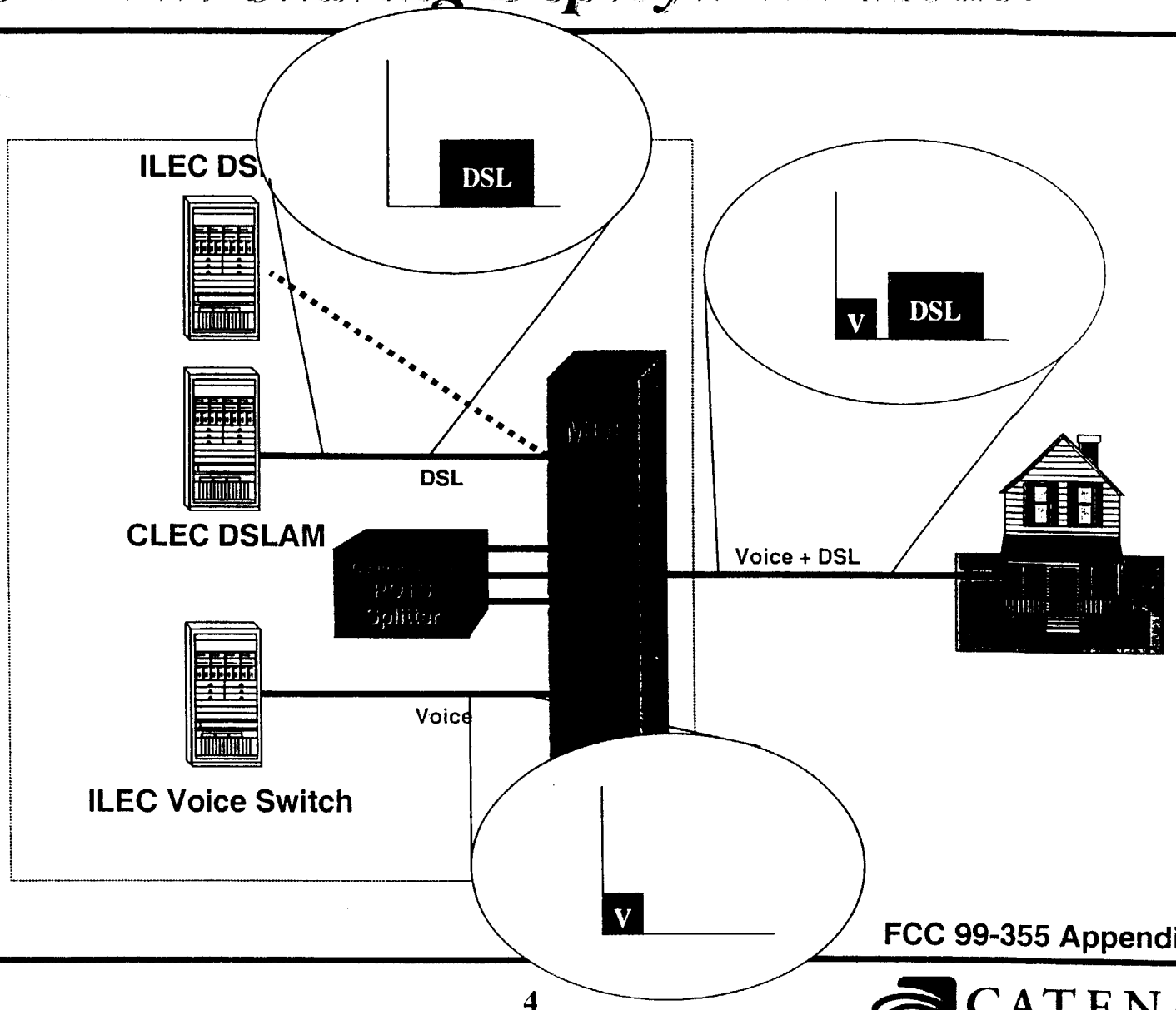


Access Trends



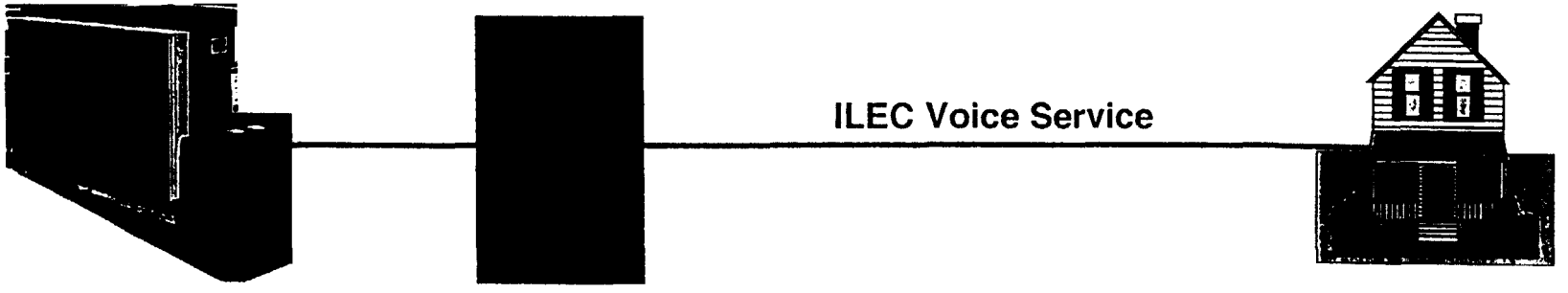
Within 3 years, the majority of subscribers will be served from Remote Terminals (RTs)

FCC's Line Sharing Deployment Model

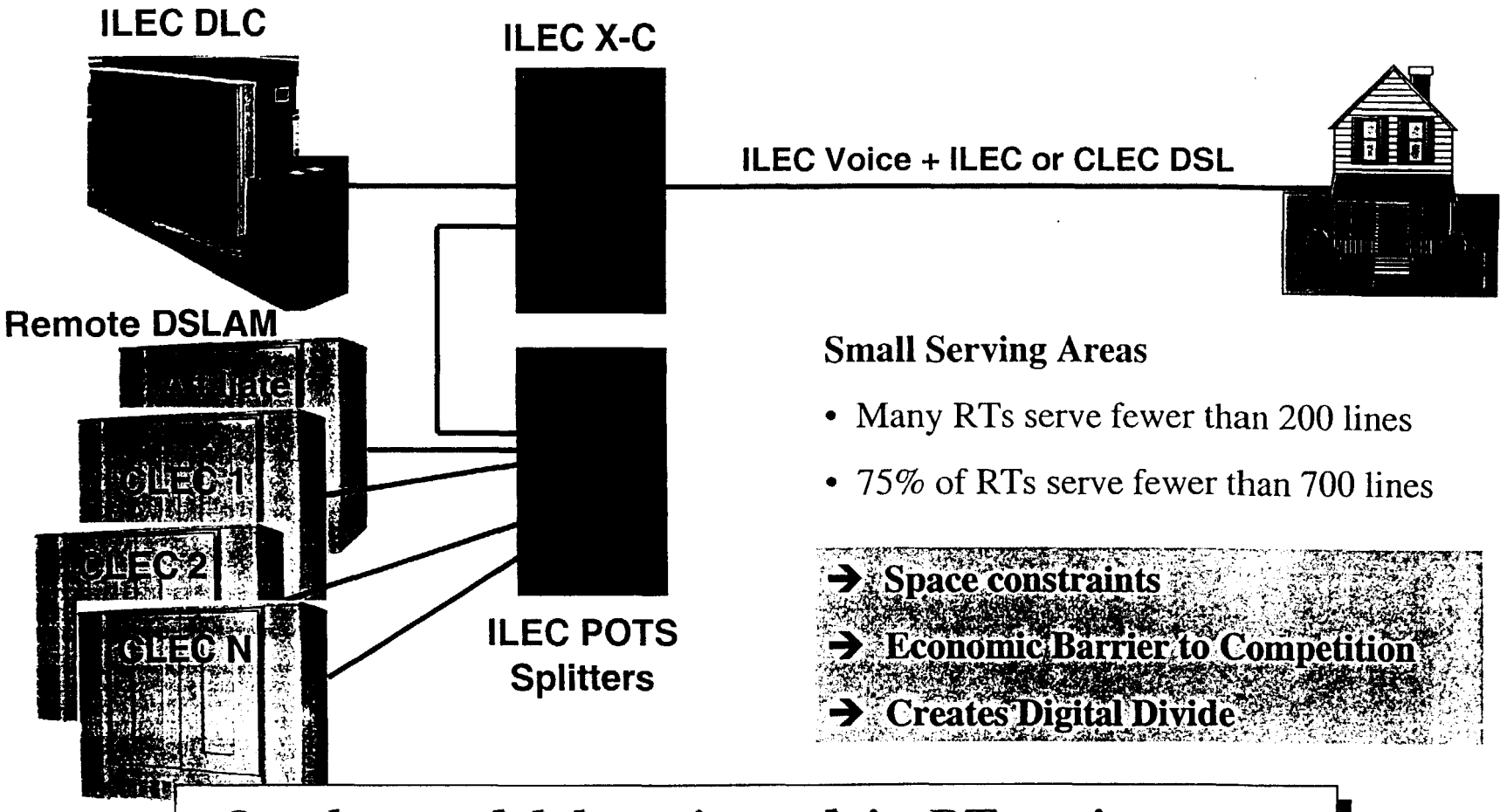


FCC 99-355 Appendix C

Today's RT Deployment Model



Implementing Line Sharing on RTs



Small Serving Areas

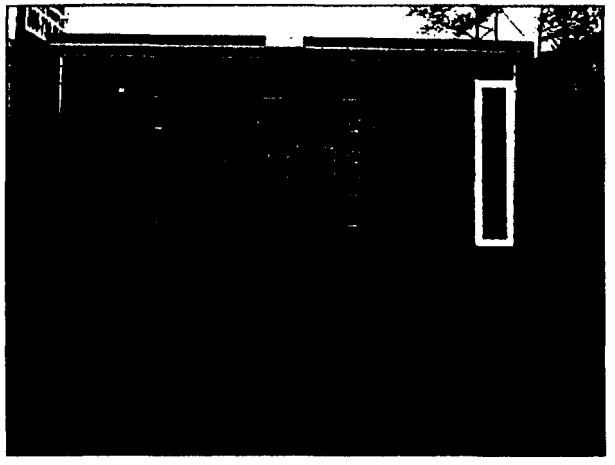
- Many RTs serve fewer than 200 lines
- 75% of RTs serve fewer than 700 lines

→ **Space constraints**
→ **Economic Barrier to Competition**
→ **Creates Digital Divide**

Overlay model doesn't work in RT environment

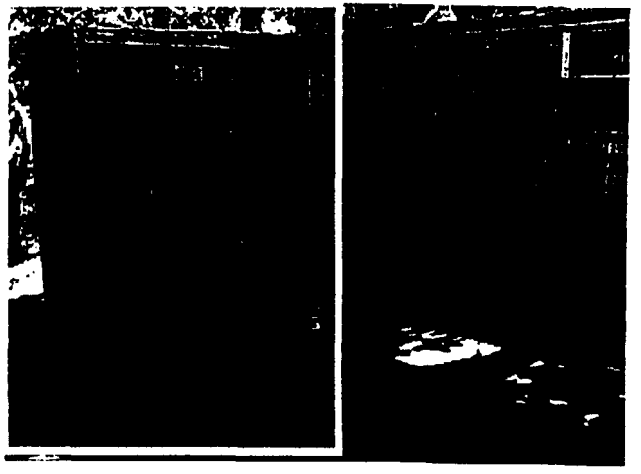
Current Solutions Fall Short

Mini-Ram



- Space constrained
- Tough to install
- Can support a maximum of only 16 DSL lines

Remote DSLAM

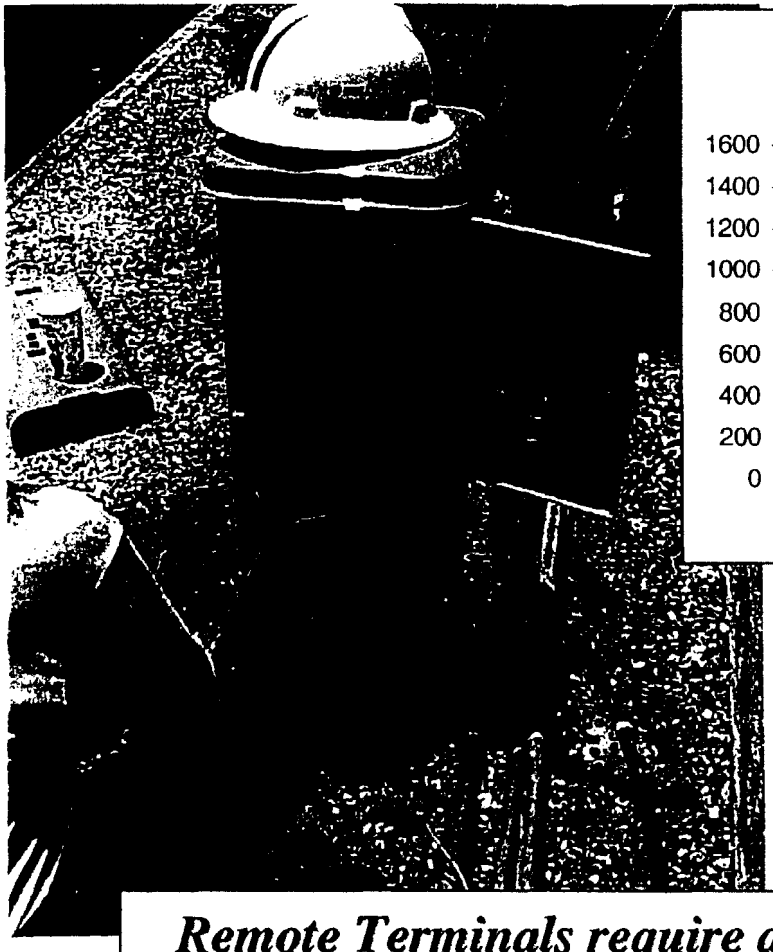


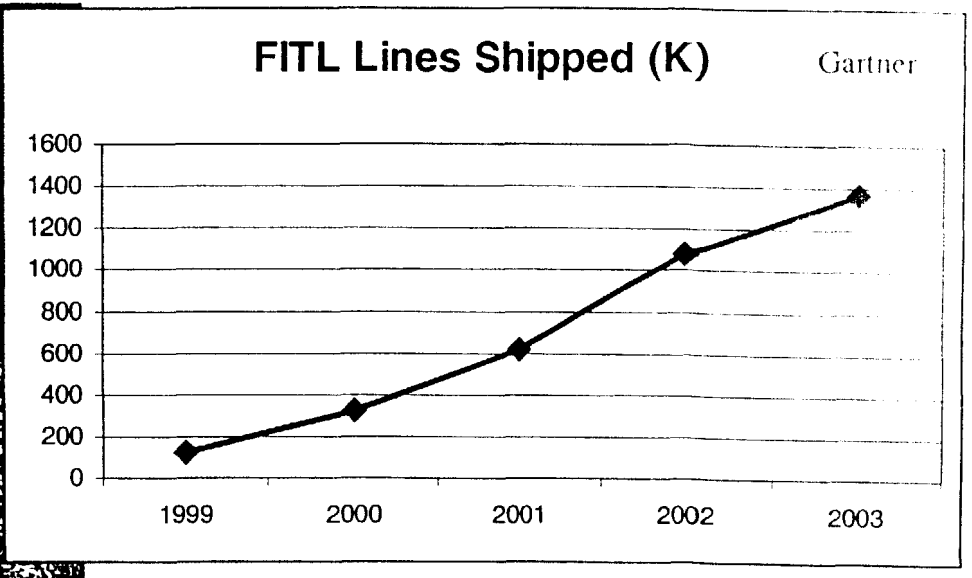
- Prohibited capital and operational cost
- "Easement" issues
- Construction lead-time

Economic and physical space barriers to competition

Fiber In The Loop (FITL)

Where do you put POT Splitters and Remote DSLAMs?





Service Providers continue to drive fiber closer to subscribers

- **Better service (higher data rates)**
- **Smaller serving areas**

Remote Terminals require an integrated deployment model

A Better Way: Integrated POTS+DSL Linecards

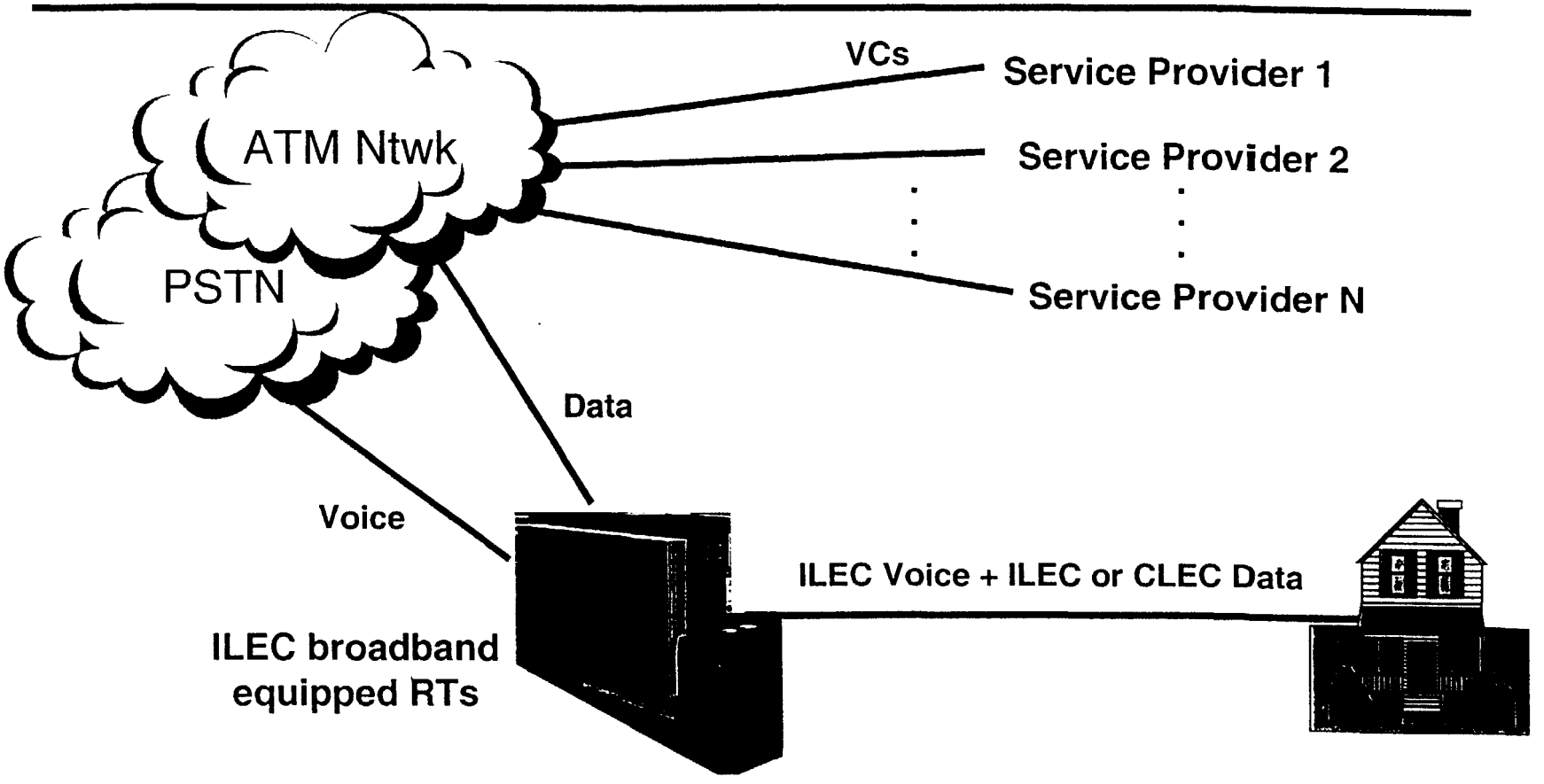
- **Simple and Elegant**
  - Integrated POTS+DSL linecards eliminate the need for overlay cabinets, complex wiring, pouring pad and resource-intensive installations.

- **Economically Viable**
  - An integrated POTS+DSL linecard deployment architecture is the most cost effective, expedient method for service providers to achieve mass-market DSL deployment in remote serving areas.

- **Scalable**
  - Advancements in DSL silicon technology enable service providers to upgrade existing DLCs on a linecard-by-linecard basis, with no reduction of POTS port capacity.

- **Reliable**
  - Integrated POTS+DSL linecards eliminate complex wiring and overlay equipment and reduce the number of network failure points.

Virtual Unbundling



Service Providers share common facilities (speeds deployment, minimizes cost)

Benefits of integrated POTS+DSL RT sol'ns

- **DSL coverage** - *eliminate the Digital Divide*
  - Addresses rural subscribers and communities
- **Simple and elegant**
  - No complex wiring, simple RT plug replacement for easy DSL upgrade
- **Low start-up costs**
  - Lowest possible DSL solution for RTs
- **Scalable**
  - Unlike overlay solutions, integrated solutions are granular and scalable
- **Speed of deployment**
  - Accelerates DSL deployment to communities currently unaddressed
- **Amortized backhaul**
  - Common facilities amortized over entire serving area
- **Reliability**
  - Eliminates complex wiring, significantly reduces number of network failure points
- **Economically viable**
  - Lowers economic competitive barrier to entry, allows affordable consumer pricing

Issues with POTS Splitters

The Traditional POTS Splitter is a simple magnetic device that mechanically "splits" the Voice band (0-4KHz) from the DSL band (27KHz-1.1MHz)

Background:

- The CO Line Sharing Order infers POTS Splitters to be the regulatory demarc
  - ILEC provides POTS on the low frequency side of the POTS Splitter
  - CLEC or Data Affiliate provides DSL on the high frequency side of the POT Splitter

The Problem:

- Regulatory policy is forcing POTS Splitters to become permanently required for DSL deployment
- POTS Splitters prevent ILECs and CLECs from adequately testing and maintaining subscriber loops

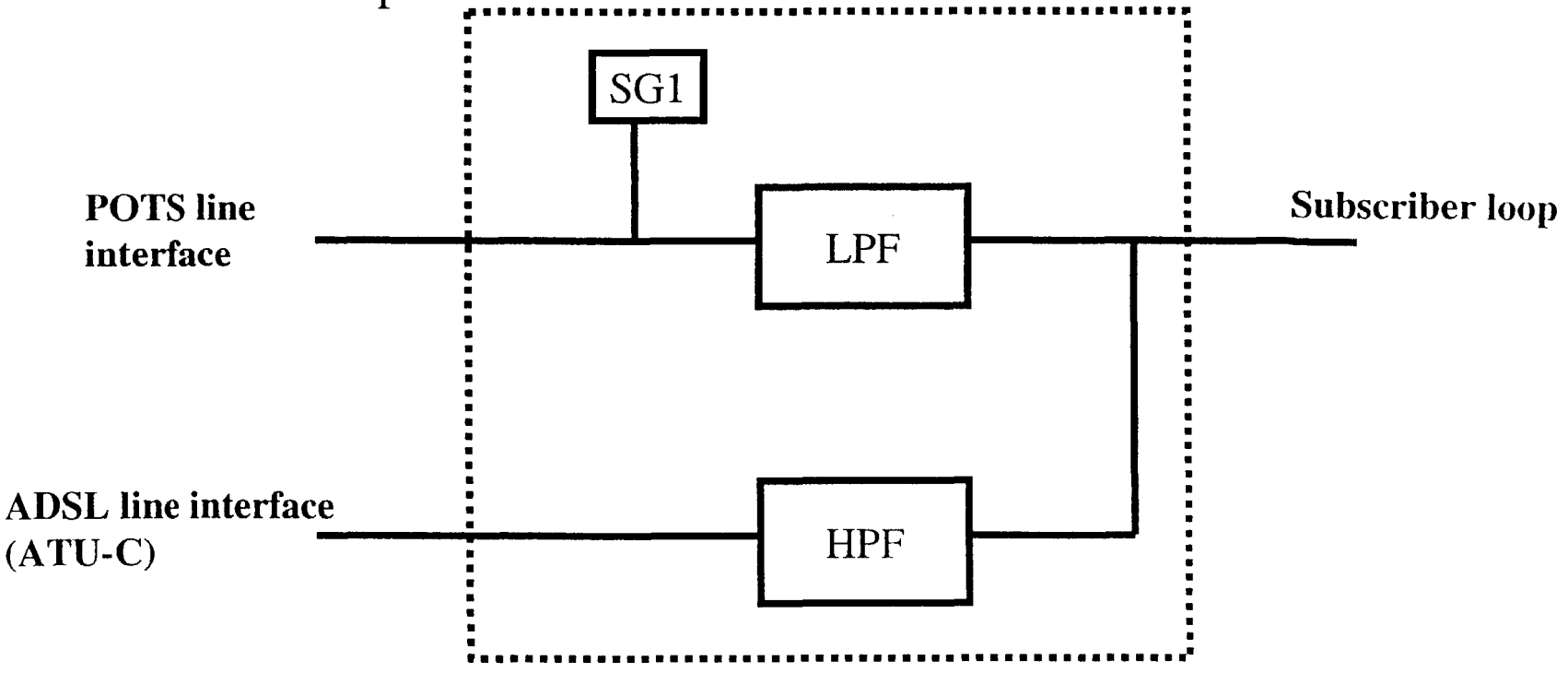
The Result:

- New highly complex "Smart" POTS Splitters are being proposed
  - Larger, expensive, complex devices requiring expensive ILEC/CLEC test heads
  - In general, POTS Splitters strand bandwidth and decreased network reliability

POTS Splitters can be eliminated from the RT collocation model

Traditional POTS Splitter

- The traditional way to couple POTS and ADSL signals onto the subscriber loop



LPF = Low Pass Filter	couples 0-4 kHz POTS signals onto the subscriber loop
HPF = High Pass Filter	couples 25 kHz to 1.1 MHz ADSL signals onto the subscriber loop
SG1 = POTS Splitter Signature	allows POTS test head to determine the presence of a POTS splitter

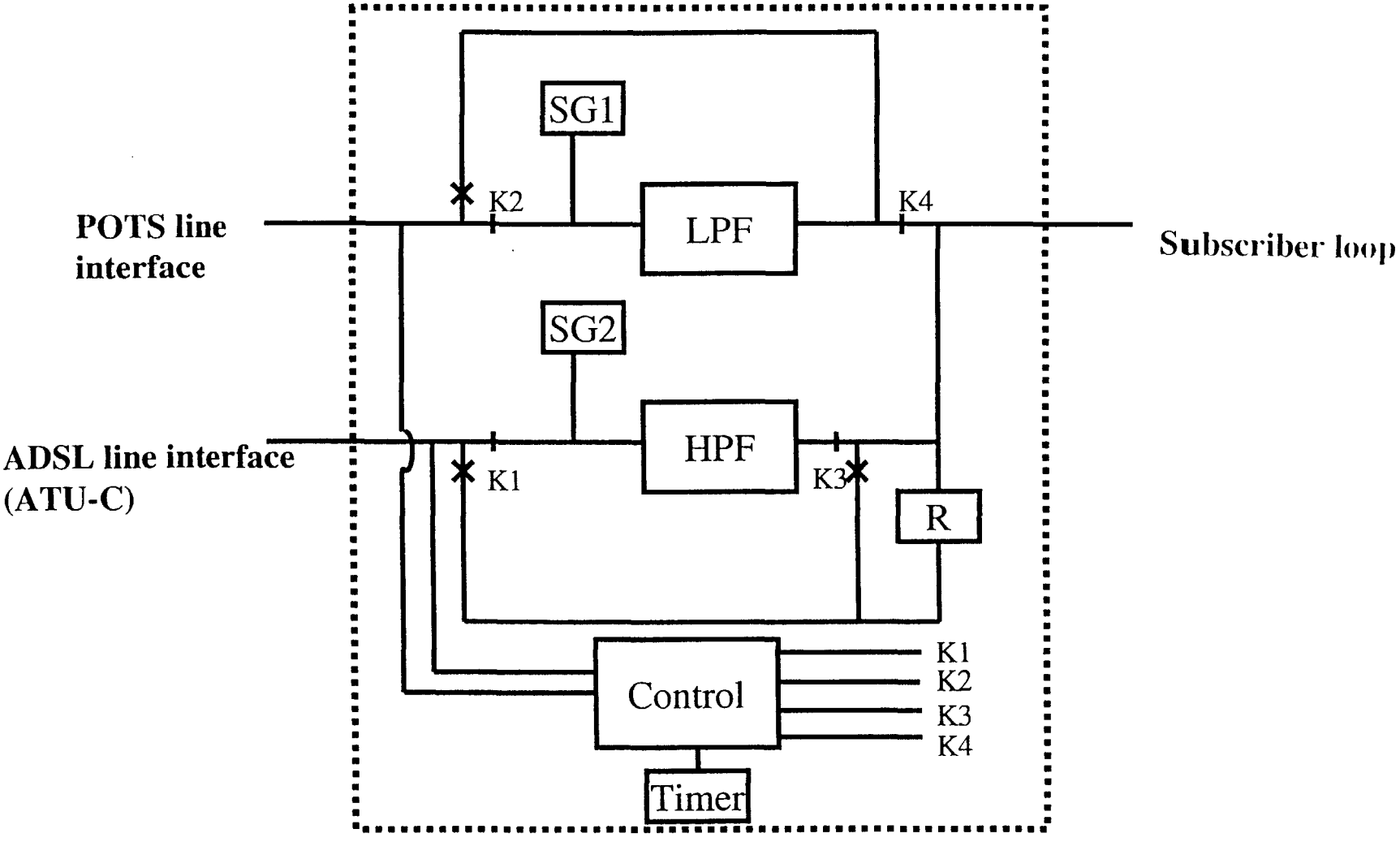
Line Sharing Test Access Requirements

- Sprint's contribution T1E1/2000-266 "Line Sharing Test Access Requirements" identifies the following requirements:
  - The CLEC must have the ability to gain full bandwidth access to a shared loop from a remote location.
  - The ILEC must have the ability to gain full bandwidth access to a shared loop for interference isolation.
  - The CLEC must be able to detect if the voice line is off-hook. This monitoring must be non-intrusive to the voice line.
  - The CLEC must be able to verify connectivity from the collocation area to the customer premises.
  - The CLEC must be able to remove the ILEC supplied battery and ground from the loop to perform testing.
  - DC blocking capacitors must be disconnected from the loop during CLEC testing.
  - The CLEC must be able to perform basic DC tests; loop length, balance and presence of load coils.
  - The CLEC must be able to access the shared loop to examine loop characteristics using a Time Domain Reflectometer (TDR).
  - The CLEC must be able to access the shared loop to perform spectrum analysis using a wide-band noise test set.
  - Intrusive CLEC loop testing must be completed within a timeout period. The timeout period must be adjustable and extendible within limits, (e.g. minimum of 30 seconds to maximum of 5 minutes).
  - If a power failure or control failure occurs during CLEC testing, normal POTS operation must be restored within a preset time period.
  - Normal POTS operation must be restored upon the failure of test access components.
  - The POTS splitter must not require powering.
  - Loop test access must be compatible with existing POTS splitter chassis and wiring.
  - Loop test access must provide "equal access" to any number of CLECs.
  - Remote test access on non-shared lines must be secure.
  - Test technologies that have already been deployed must be utilized to the extent possible.

Line Sharing Test Access Issues

- The traditional POTS splitter approach for line sharing introduces several problems that prevent the ILEC and CLEC from adequately testing and maintaining the subscriber copper loop
  - HPF prevents CLEC from having DC access to the loop which prevents subscriber loop testing
    - solution is to allow bypass of HPF via a relay contact
  - CLEC must be able to detect if the voice line is off-hook
    - solution is to sense whether the line is off-hook prior to initiating testing
  - LPF prevents ILEC from having full spectrum test capability of the subscriber loop which prevents adequate broadband loop qualification
    - solution is to allow bypass of LPF via a relay contact
  - CLEC must be able to remove the ILEC provided POTS battery and ground to allow loop testing
    - solution is to remove ILEC provided battery and ground via a relay contact
  - If a power or control failure occurs during CLEC testing, normal POTS operation must be restored within a preset time period
    - solution is to provide a time-out function in the splitter which ensures POTS service is restored in the event of a failure

"Smart" POTS Splitter



Incremental Elements in the "Smart" POTS Splitter

- Elements that are incremental to those in the traditional POTS Splitter in order to address line sharing test access requirements:
  - SG2 is a signature that the CLEC test head can detect to determine the presence of a POTS splitter
  - K1, a relay which allows the CLEC test head to unobtrusively monitor the subscriber loop through a high impedance (R) to determine if the POTS line is in use
  - K2, a relay which provides the ILEC with a short circuit across the LPF to allow full spectrum access to the subscriber loop
  - K3, a relay which, when operated with K1, provides the CLEC with a short circuit across the HPF to allow full spectrum access to the subscriber loop (including DC)
  - K4, a relay which allows the CLEC to remove the battery and ground provided by the ILEC POTS line interface
  - A control block, which controls the relays identified above in response to control signals from either the ILEC or CLEC test heads (controlled via longitudinal signals from the test head)
  - A timer to ensure that in a time-out scenario, all relay contacts are released so that the lifeline POTS service can be restored

POTS Splitter Conclusions

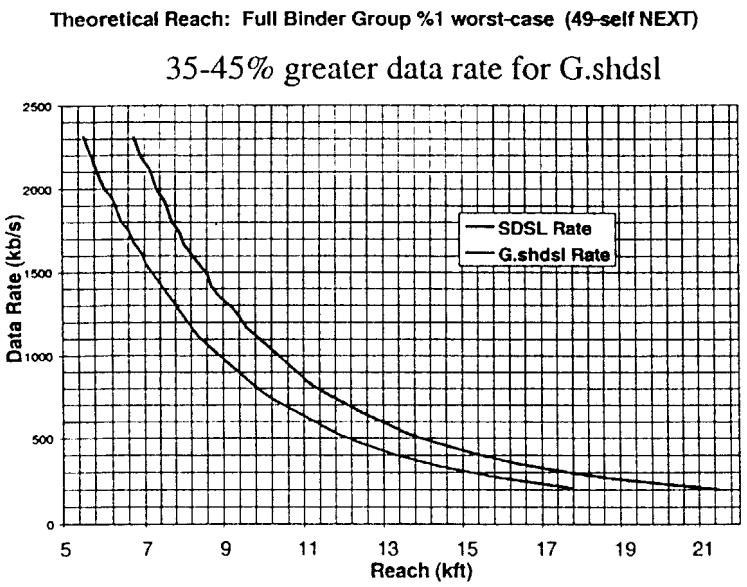
- A "Smart" POTS Splitter, like that pictured previously is one of the many solutions being proposed to address the operational problems associated with line sharing test access

- All line-sharing test access solutions share the common theme of adding additional complexity to the POTS Splitter and ILEC/CLEC test heads

- The addition of more complexity to the POTS Splitter makes it even larger and more costly than the traditional POTS Splitter. This additional size may be tolerable (although undesirable) in the central office environment, but in the remote cabinet, it is not feasible

Direction of Technology Innovation & Stds

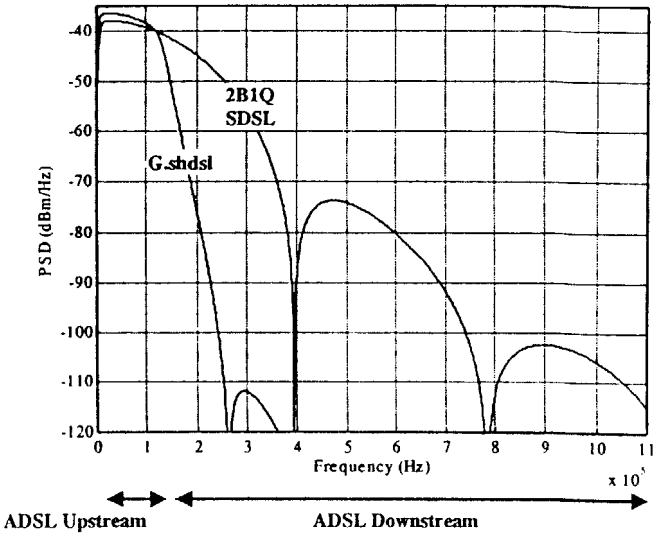
SDSL Data Rate vs. Reach



Superior Rate/Reach

PSD: G.shdsl vs. SDSL

(768 kb/s example)

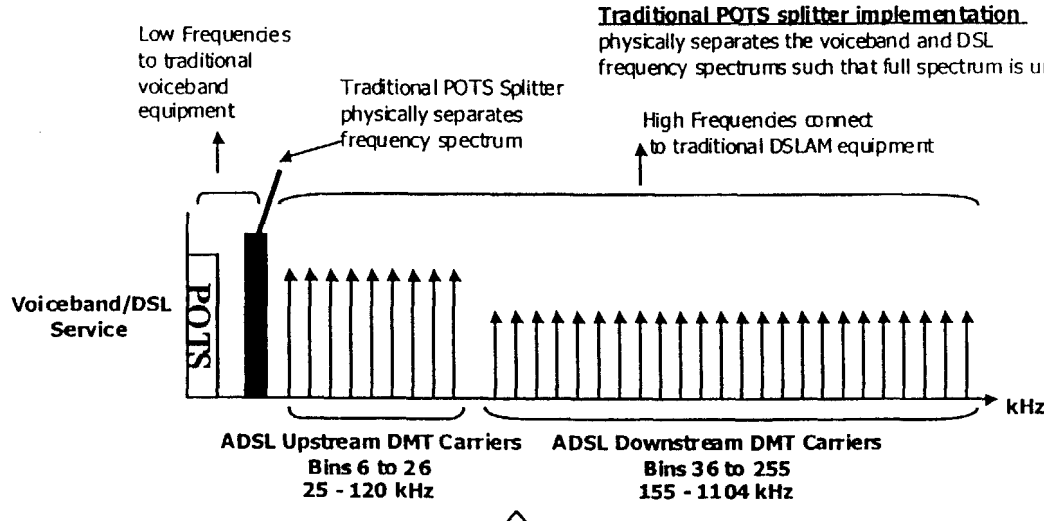


Superior Spectral Compatibility

G.SHDSL will become the "volume" symmetrical service offering

- **ITU Standard (G.991.2) -> will displace SDSL, HDSL, HDSL2**
- **192kbps to 2.312Mbps symmetric** (N x 64 kb/s, N=3..36), repeater options

All Digital Loop - Splitterless Full Spectrum

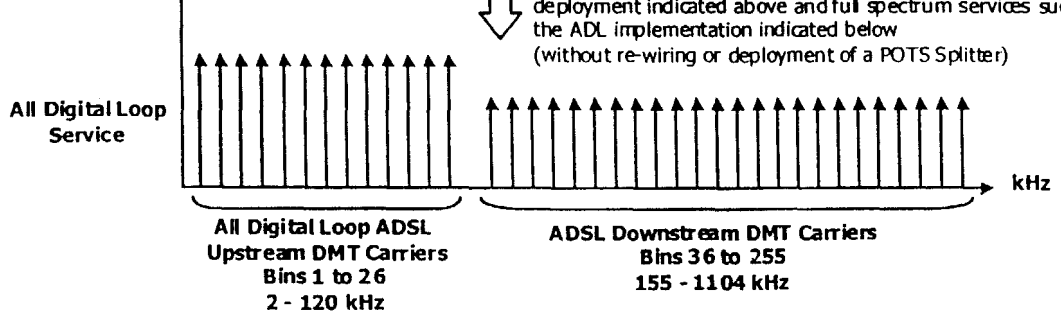


Traditional POTS splitter implementation
physically separates the voiceband and DSL frequency spectrums such that full spectrum is unavailable

Full spectrum is required for full bandwidth services:

- ADL
- Symmetric services
  - G.SHDSL
- Derived voice

Splitterless Full Frequency Spectrum Implementation
enables the easy transition between the voiceband/ADSL deployment indicated above and full spectrum services such as the ADL implementation indicated below (without re-wiring or deployment of a POTS Splitter)



New services require full spectrum connectivity

Conclusions

- **Virtual collocation, and the deployment of integrated POTS+DSL plug-in cards and solutions, allows service providers to:**
  - Deploy cost effective and efficient network architectures
  - Lower the economic barriers for competitive providers
  - Eliminate the costs and complexities of mechanical POTS Splitters
  - Enable the continued innovation of technology and future services
  - Enhances competition with cable operators and wireless service providers, without eliminating competition between ILECs and CLECs using UNEs

- **Eliminate POTS Splitters as the regulatory demarc**
  - Strands spectrum
  - Adds cost and complexity
  - Stifles network convergence

Integrated RT solutions allow Advanced Services to become ubiquitous, affordable and available to all Americans